DOCUMENT RESUME

ED 277 367 IR 012 476

AUTHOR Crist-Whitzel, Janet L.; And Others
TITLE Patterns of Implementing a District Computerized Instructional Management System.
INSTITUTION Far West Lab. for Educational Research and Development, San Francisco, Calif.
SPONS AGENCY National Inst. of Education (ED), Washington, DC.
PUB DATE Apr 86
CONTRACT 400-83-0003
NOTE 35p.; Paper presented at the Annual Meeting of the American Educational Research Association (67th, San Francisco, CA, April 16-20, 1986). For another report on this project, see IR 012 475.
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Adoption (Ideas); *Computer Assisted Testing; *Computer Managed Instruction; Educational Objectives; Elementary Education; *Mathematics Achievement; Pilot Projects; Program Evaluation; *Program Implementation; School Surveys; Success
IDENTIFIERS *Far West Laboratory for Educational R and D CA

ABSTRACT

A two-part research and evaluation study was conducted to examine an elementary (K-8) school district's implementation of a computerized instructional management system, the "Computer-Managed Instruction/3000" (CMI), as a means of facilitating the assessment and updating of student mastery of 78 district-defined curricular objectives. The testing system consisted of a data bank of tests based on the district mathematics objectives, equipment to machine score student answer sheets, and reports detailing student mastery of the objectives. This system was piloted by administrators and teachers at four district-selected schools. A detailed interview schedule was developed to elicit such information as background in the district; knowledge of the CMI system, including how, why, and by whom it was selected; uses of the system for testing and instruction; technical problems; potential uses of the system; and its effects on school organization and instruction. Analysis of the responses of 49 school staff members--principals, resource teachers, teachers, and clerical staff from both pilot and nonpilot schools--revealed wide variation on all of the factors studied. The factors that appeared to be influential in the nature and degree of CMI implementation efforts at the individual school sites were identified as: (1) technical procedures and personnel; (2) focus on instructional uses; (3) key instructional personnel; (4) site climate and leadership; (5) training; and (6) attitudes and incentives. A consistent ordering of the four schools along these dimensions was found, and it is suggested that the patterns of successful implementation and use of the CMI system identified in this study can provide guidance to other school districts planning and implementing their own CMI systems. A coding matrix is appended and references are included. (DJR)

SCOPE OF INTEREST NOTICE

The ERIC Facility has assigned this document for processing to:

In our judgment, this document is also of interest to the Clearinghouses noted to the right. Indexing should reflect their special points of view.

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

ED277367

PATTERNS OF IMPLEMENTING A DISTRICT COMPUTERIZED INSTRUCTIONAL MANAGEMENT SYSTEM

Janet L. Crist-Whitzel
Patricia D. Terry
Richard Edelstein
Brian Rowan

FAR WEST LABORATORY
FOR EDUCATIONAL RESERCH AND DEVELOPMENT

Paper Presented at the Annual Meeting of
The American Educational Research Association

San Francisco, California
April, 1986

This work was supported by a contract from the National Institute of Education, Department of Education, under Contract No. 400-83-0003. The contents of this report do not necessarily reflect the views or policies of the Department of Education or the National Institute of Education.

IR012476

BEST COPY AVAILABLE

Patterns of Implementing a District Computerized Instructional Management System

This paper presents results of a field research and evaluation study designed to examine the implementation of a district-based computerized instructional management system, the Computer Managed Instruction/3000 (CMI). The study was conducted by the Far West Laboratory in cooperation with an elementary school district with grades K-8. During the implementation process, the researchers undertook a formative evaluation of the use of the CMI testing system. The system had been selected by the district as a means to facilitate the assessment and updating of student mastery of 78 district-defined curricular objectives. The district selected four schools (two elementary and two middle schools) to pilot the CMI system. The objective of this paper is to describe the patterns of use of the CMI system as it was implemented within these four pilot schools. This analysis is part of a larger study reported elsewhere (Crist-Whitzel, Edelstein & Terry, 1985).

This project emerged from a previous study conducted by the Instructional Management Program at the Far West Laboratory, a regional survey of instructional management practices in school districts located in the Laboratory's tri-state region (Northern California, Nevada, and Utah). Educators reported computerized instructional management systems as "exemplary" practices for instructional improvement (Rowan, Edelstein, & Leal, 1985). However, the survey also elicited concerns about problems of implementing district-level instructional management systems. Examples of such concerns included lack of training of system users, lack of assessment, difficulty in adapting systems to the needs of instructional decision makers, and fears of evaluation by teachers (Rowan; 1984, Rowan et al., 1985).

Perspectives

Concrete guidelines for designing instructional management systems have been provided by the literature on criterion-referenced testing (Linn, Madaus, & Padulla, 1982), curriculum alignment (Milazzo, Buchanan, & Schutz, 1981), mastery learning (Block, 1971; Bloom, 1976), and outcome-based education (Spady, 1982). However, less attention has been paid to problems and guidelines for implementing such systems (Filby, 1984).

Studies of change and innovations in schools and districts have shown that success of implementation, including district-wide administrative computing systems, depends upon many factors (Brown, 1984). One important factor is the support of the principal and other key personnel such as resource teachers (Brown, 1984). The literature shows that organizations (including schools) tend to adapt or adopt innovations consistent with their interests and "climate" (Doyle et. al., 1976; Pincus, 1974). Therefore, we felt it was important to examine implementation of this district's CMI in the context of each school and its key personnel.

CMI and District Background

Oak Knoll Elementary School District (a pseudonym), a medium-sized district of 18 elementary and 6 middle schools, instituted a district curriculum correlated with CTBS (California Test of Basic Skills) performance objectives in 1983. The district adopted a plan requiring teachers to update their students' progress periodically on 78 district objectives for student performance. Teachers had been updating with a "matrix" on which they recorded mastery, partial mastery or non mastery for the objectives required for their grade level and subject(s). Some teachers had used their own tests for updating, while others used their own best judgment on their students' progress. The CMI system fit into this larger district instructional management program by providing a systematic and standardized means for teachers to accomplisn the task of updating. In interviews we held with staff in the district, there seemed to be a lack of distinction between "updating" and the "CMI." However, since the purposes and uses of both of these are related and aim toward the same end, we did not (and really could not by and large) attempt to separate the concepts of "CMI" versus "updating" in our data or in our analyses.

In 1984 the district purchased "Computer Managed Instruction/3000" (CMI), a software package for the HP 3000. The CMI system was designed by a school district in another state. Using its own objectives, OKESD constructed criterion-referenced tests (CRT's) correlated with CTBS objectives. The CMI can generate and machine score CRT's; update student records for mastery of district objectives while scoring student tests; generate reports on mastery of objectives with information on individual students, classes or grade levels within schools and across schools in the district; correlate objectives with instructional materials and strategies; and allow teachers to input their own tests into a test data bank.

The CMI pilot implementation program was initially planned to start at the beginning of the 1984-85 academic year. However, this schedule was delayed due to problems in securing the necessary hardware. By the middle of the school year, hardware (consisting of a computer terminal and a test scanner) was installed in four pilot schools, designated by the district to implement the testing system. While other schools had access to the tests, only some chose to use them and the scanning equipment located at the district office. During the span of our study, the district utilized the CMI feature of district-developed CRT's in mathematics, and we thus focused on studying CMI use in mathematics. CRT's for reading and language arts were also being developed, but had only begun to be implemented by the end of the school year.

Method

This section briefly describes the data sources used in this study, our interview sample, and method of data analysis.

Data Sources

A detailed interview schedule was developed, which covered such information as background in the district; knowledge of the CMI system

regarding how, why, and by whom it was selected; uses of the system for testing and instruction; technical problems; potential uses of the system; and effects of the system on school organization and instruction [see Terry, Crist-Whitzel, Edelstein & Rowan (1986) for a copy of the interview schedule). Responses to these interviews served as the data sources for this study. [A second interview schedule was devised for district office personnel to capture more detailed information concerning CMI-related decisionmaking, planning, coordination, and communication at the district level, but results of these interviews are not the subject of this paper].

Sample

Through a process of nomination by district and school site staff, 49 administrative and teaching personnel from the four pilot schools and four similar schools not implementing the CMI were selected for our school-level sample. There was an attempt to balance the sample with both users and non-users, as well as to include respondents with both positive and negative attitudes toward the system. [Eleven district-level staff members from the central office were also interviewed for a separate analysis of district-level issues]. Interviews lasting approximately one to two hours were held from March through June, 1985 with 26 respondents from the four pilot sites (four principals, six resource teachers, 13 teachers, and three aides) and 23 respondents from nonpilot schools (four principals, four resource teachers, and 15 teachers).

The sample upon which the present analysis was based included the 26 individuals from the four pilot schools. Table 1 shows the breakdown of this sample by school and position.

Table 1

Interview Sample from Pilot Schools

School / Position	A Elem.	B Elem.	C Mid.	D Mid.	Totals
Principal	1	1	1	1	4
Resource Teacher	1	1	2	1	5
Teacher	5	1	4	4	14
Clericals/Aides		1	1	1	3
Totals	7	4	8	7	26

The four schools included two elementary schools (A and B) and two middle schools (B and C). The principal and the math resource teacher were

included in the sample at each school. In addition, a reading resource teacher at School C was interviewed. In each of three schools (B, C, D) a clerical person or a special aide involved in entering data into the computer was interviewed as well. Four or more teachers in each school except School B were interviewed. In School B, where CMI was not implemented even though it was a designated pilot school, we had difficulty finding teachers who were willing to be interviewed. Thus, our sample from that school included only one teacher.

Data Analysis

Interviews were transcribed, and written summaries were prepared by the interviewers from audiotapes and handwritten notes. Data from the interviews were examined quantitatively using an interview coding scheme (see Appendix) to obtain general school patterns of responses in the major categories of perceived CMI purposes, actual uses, potential uses, perceived benefits, incentives to use CMI, overall attitudes toward CMI, and types of resistance to using the system. Such a quantitative description allows some comparisons to be made across schools and suggests some relationships among categories which might influence the degree and success of implementation attempts.

In addition, to obtain a more complete description of the pilot schools' implementation patterns, we examined the actual interview transcripts and summaries for descriptive information and illustrative quotations that would help provide a more qualitative "picture" of the schools and their CMI implementation. Examples of some of the illustrative quotations from selected teachers at each pilot school are included in the Appendix. Some examples are included in the text to help illustrate the "sense" of the data. Before we present our data, some cautions are in order. While the district designated four schools as "pilot" schools, in reality only three of them, one elementary school (A) and the two middle schools (C and D), actually implemented the CMI system. In addition, as the year progressed, a few "nonpilot" schools actually began some degree of implementation as well, which blurred the distinction between pilot and nonpilot schools. In the case of these nonpilot schools, the district CMI tests were used, but CMI equipment was not located on-site. Teachers at those schools had their CMI tests scored at the district office and received the same type of CMI reports as did teachers in the pilot schools. Even though implementation attempts thus extended beyond the designated pilot schools, we will confine our discussion of implementation patterns here to the original four pilot schools.

Results

In presenting our findings on school implementation patterns, we will first give brief "pictures" of each of the four pilot schools, based on a combination of both quantitative and qualitative data analyses. We first will present an overall description of the degree of use of the CMI along with comments concerning the general "climate" or disposition of school staff toward the CMI, its purpose(s), and how it fit into the school's instruction. Then we discuss our findings in terms of several organizing themes to provide further details of the four schools' patterns of CMI implementation: (1) technical procedures and personnel; (2) key instructional and site leadership in relation to the CMI; and (3) general attitudes toward the CMI.

The following school descriptions or brief "portraits" are based on data summarized in Tables 2 and 3. In this description and in the tables, the schools are presented in order of observed degree of CMI implementations. First is School A, an elementary school, followed by Schools C and D, the two middle schools, all of which exhibited varying degrees of CMI implementation; the fourth is School B, an elementary school which, as noted, did not implement the CMI.

Elementary School A

School A presented the most advanced and successful implementation of the CMI system. The stage had already been set at this school for CMI implementation, as School A had previously pilot tested a precursor local system of criterion-referenced testing with goals and objectives similar to those of the CMI. School A's principal had been involved both in setting up that system and in selecting the CMI as a district-wide system.

School A respondents, including the principal and others, seemed to share a high degree of commitment to the CMI system and its purposes. Eighty-six percent of those interviewed displayed a positive attitude toward the CMI, with none indicating a negative attitude and one who was uncertain. As a group, they perceived more purposes for the CMI than respondents from the other schools and they shared a high degree of emphasis on its purpose as curriculum-related (71%). This school was the only one that had a unified focus on a curricular purpose; each of the other schools had only an isolated respondent even mentioning the curriculum when referring to the CMI's purpose. School A was also the only school with a nearly unanimous agreement (86%) on objectives as the focus of their curriculum content; the other schools' respondents indicated more diverse foci, with generally less than half using objectives as their focus. Thus, it would appear that the instructional philosophy of School A personnel was both shared by the staff in general and consistent with the nature and purpose of the CMI. This school was also one that explored and tried new ideas, a disposition that undoubtedly facilitated implementation of the CMI as an innovation. As one staff member stated, "Whenever anything new is tried in the district, it is tried here at (A)."

Table 2
Summary Information on Pilot Schools:
Purposes and Use of CMI

School	n	Perceived Purposes	Primary Users	How Much Used Overall	How used Mainly	Degree of Actual Use	Predominant Uses	Potential Uses
A	7	High in number 1) Curriculum 2) Monitoring, Testing, Standardization	1) Tchrs. 2) R. Tchrs.	A lot	Use tests, but not self scan	High	Instructional: Planning*, Grouping*, Diagnosis, Pacing Testing: Mastery*, & Min. Prof.* Assessment	Mid in Number 1) Diagnosis (43%) Parent Conf. (43%) Parent Conf.
C	8	Low-Mid in No. 1) Testing 2) Monitoring, Standardization	1) R. Tchrs. 2) Tchrs.	Some	Use tests, & self scan	Moderate	Instructional: Planning, Grouping Testing: Mastery Assessment	High in Number 1) Parent Conf. (50%) 2) District Updating/Testing (50%) Diagnosis (38%)
D	7	Mid-Low in No. 1) Testing 2) Standardization	Clerical	Some	Use tests, with someone else scan	Moderate-Low	Instructional: Diagnosis, Planning Testing: Mastery Assessment	Mid in Number 1) Evaluation of Staff (43%) District Updating/Testing (43%)
B	4	Mid-Low in No. 1) Monitoring	Clerical (Updating; not CMI)	None	Not use tests or scan	Low (None)	NA	Low

*High agreement among school's respondents

Table 3
Summary Information on Pilot Schools:
Attitude Categories

School	n	Overall Attitude	Level of and Major Perceived Benefits	Level of and Major Incentives to Use CMI	Degree of and Major Sources of Resistance
A	7	Positive (86%) None Negative	High Level 1) Instruction (D,P,G,Pl) (86%) 2) District Standardization (71%) Focus on Objectives (71%)	High Level 1) Mandated (71%) 2) Please Principal (29%) Potential benefits (29%)	Low Level Technical problems/ frustrations (57%) Report/data problems (43%)
C	8	Positive (63%) Some Negative (25%) One Uncertain/ Unknown (13%)	Mid Level 1) Easier to test/ Update (63%) 2) Instruction (D,P,G,Pl)(50%) Benefit Students (50%)	Mid Level 1) Mandated (25%) Easier/Faster(25%)	High Level Technical problems/ frustrations (88%) Slow processing/ reporting (75%) Inadequate training (50%) Takes too much time (35%) "Other" (38%)
D	7	Positive (57%) Some uncertain/ Unknown (29%) One Negative (13%)	Mid Level 1) Easier to test/ Update (71%) 2) Instruction (D,P,G,Pl)(57%) Expectations for teachers (57%)	Mid Level 1) Mandated (29%) Easier/Faster(29%)	Mid Level Technical problems/ frustrations (43%) Report/data problems/ (43%) Too much class time (43%) Lack of confidence in tests (43%) "Other" (43%)
B	4	Uncertain/ Unknown (100%)	Low Level 1) Instruction (D,P,G,Pl) (50%) District Standardization(50%)	Low Level 1) Mandated (50%)	Mid Level Too late in year (75%) Inadequate training (75%) Too much/too rapid change (50%) Technical problems/ frustration (50%)

CMI technical procedures and personnel. Although School A did not utilize a clerical/technical support person to operate the hardware and scan tests for the CMI, the resource teacher performed such a function, thus avoiding many of the technical frustrations evident among teachers at some schools who had to deal directly with the system hardware. Several teachers did report encountering problems in using the system (as would be expected in almost any innovation or implementation attempt); however, unlike some teachers at other schools, School A teachers did not seem to see such problems as overwhelming but rather as more of a challenge or as nuisances to overcome so they could move on. For example, a representative comment by one teacher was that "Like any new system it . . . has its little idiosyncrasies you'd have to work out . . . all that's been pretty much eliminated."

Key personnel. School A had a resource teacher (RT) who was centrally involved in the operation of the CMI system and who played a key role in the CMI's success at the school. In addition to coordinating the technical aspects of the CMI operation, the RT facilitated the school's focus on instructional applications of the CMI. The RT interpreted results from the CMI reports to individual teachers; assisted teachers in focusing on instructional objectives in lesson planning; worked collaboratively with teachers at each grade level to coordinate grouping of students for instruction based on their degree of mastery or non-mastery of district objectives; and, in addition, served as a learning specialist providing instruction for those groups of students who had not mastered particular objectives and thus needed specialized help. The RT operated a learning lab specifically organized to provide such instruction. Because the "master teacher" (RT) coordinated the CMI, worked with teachers to use CMI information in their instruction, and provided extra instructional help to supplement teachers' own teaching efforts, School A appeared to correspond to the description of "Baker" School District in a study reported by Williams and Banks (1984).

The importance of the RT's role in CMI implementation at School A was illustrated by one teacher's comment that

> (RT) gave us an inservice on (CMI) per grade level . . . (It was) very effective . . . (For ongoing support) that would be (RT) again. . . . she is very supportive of the program and gives extra in-service (is) there if you want extra help . . . all you have to do is go next door and she's willing to help.

As mentioned earlier, the principal (P) also provided support and leadership for the CMI. A teacher commented, "I think it's (the P's support) absolutely (that encourages CMI use), and I think that there is a willingness on the staff to cooperate with the administrative point of view." Another teacher stated, "(The Principal) is very supportive of this system." This combination of administrative and instructional leadership seemed to be an important key to the success of the CMI at School A.

Degree and focus of implementation--uses of CMI. Teachers at School A used the CMI to a greater extent than at any other school ("a lot" compared to "some" at the two middle schools and "none" at the other elementary

school). Their predominant uses were instructional, especially for planning and grouping--for both of which there was high agreement (both 86%). Compared to other schools, there was also a stronger indication of CMI use by School A teachers for other instructional applications of diagnosis and pacing (both 43%). There was also high agreement on using the CMI for assessment of mastery and minimum proficiency (57%). In no other schools was there such high agreement (and such high agreement for multiple uses) among respondents concerning use of the CMI. Apparently, their shared support for the CMI and its multiple purposes were closely related to and facilitative of their shared multiple uses, and especially their instructional uses, of the CMI. Examples of teachers' reports of their CMI uses are shown in Appendix F.

Respondent attitudes related to CMI. Not surprisingly, School A staff had the most positive attitude toward CMI (86% positive and none negative). One teacher stated, "What I really like about it is . . . that it does correlate very closely with the CTBS . . . I can't think of anything I really don't like about it." Also indicative of teachers' positive regard for the system was School A's highest average number of benefits reported per respondent (4.3, vs. 3.4, 3.3, and 1 for the other three schools). In addition, again consistent with their high degree of shared responses concerning CMI purposes, instructional philosophy, and uses of the CMI, School A had the highest shared perception of all schools on CMI benefits, and especially instructionally related benefits (86% reported benefits of diagnosis, planning, grouping, or pacing; 71% suggested a benefit of improving instruction by focusing on objectives).

Consistent with this pattern, School A exhibited the least amount of resistance and the most perceived incentives toward using the CMI. Although respondents seemed strongly influenced by being mandated to use the CMI, School A was the only school to list pleasing the principal (note the earlier discussion on the principal's strong support for the CMI and his apparent "school climate" leadership) and potential benefits as reasons or incentives for using the CMI system.

Middle School C

School C, a middle school, evidenced the second highest degree of implementation of the CMI among the four pilot schools. The principal and staff, however, did not have the same degree of commitment to CMI, the shared instructional philosophy, the perceptions of CMI purposes, potential and benefits, or the CMI uses that were evident at School A.

The predominant purposes of CMI reported by School C teachers were testing-related: testing and mastery assessment (75%); monitoring student progress (38%); and standardization of district measures of mastery (38%). For example, individual teachers mentioned CMI's purpose as "(focusing) you on the proficiencies" or as "assess(ing) mastery of skills and objectives their curriculum focus: 38% responded that their focus was on objectives, while the same number used the text as their curriculum focus. Thus, they did not appear to have the same degree of shared instructional focus or the shared curricular purpose of CMI that was evident among School A teachers.

CMI procedures and personnel. When School C's CMI implementation began, the math resource teacher had coordinating responsibility, which primarily involved setting up files for all CMI tests. With no technical support available, teachers scanned their own tests. Later, School C made a change in its CMI operation. The reading resource teacher assumed an instructional support role, which included advising teachers on using CMI information, somewhat similar to that of the RT in School A. In addition, a substitute teacher with two free periods was assigned the technical support function of scanning tests. Teachers were reportedly relieved when they no longer had to scan their own tests. One teacher seemed satisfied with the arrangement of having the scanning performed by a designated person, "All scanning is done by the resource teacher or an assistant, and the tests are well organized in files and ready to administer."

Key personnel. As mentioned above, two RTs were involved in varying ways in School C's CMI implementation. The math RT initially coordinated the tests and the filing system, but did not deal with instructionally related support to teachers. Approximately midway through School C's 1984-85 CMI implementation, the reading RT did take on a more active role in providing instructional support to teachers in using CMI information. As already mentioned, a technical support person was added to the staff to scan the CMI tests. The importance of that support was illustrated by one teacher's comment:

> Unless we have an aide to put these tests through the scanner, I don't see how a system like this could . . . function, and that's just with basically two of us (using it all the time) and just a couple other teachers involved once in awhile. I have a question in regards to how slow will (the) system become when more teachers and more schools are involved.

While the principal (P) gave positive verbal support to the CMI, he did not appear to take an active role in its implementation. One teacher stated that "(P) told me I'd like the system" but added that "(P) never gets involved."

Degree and focus of implementation--uses of CMI. Overall, the response of School C personnel was that they used the CMI to "some" degree. They had the second highest rate of usage: 2.4 different coded uses per respondent compared with about twice that much (4.6) for School A staff. Both School A and School C evidenced an equivalent total number of different uses which was considerably higher than School D, whereas School B respondents reported no uses. However, at School C there was less unanimity of uses than at School A, with the highest reported uses (at a moderate level) for instructional uses of planning and grouping and for the testing-related use of assessment of mastery (each 38%). Thus, there were fewer instructional uses of the CMI at School C than at School A. Appendix F includes examples of teachers' explanations of their uses of CMI results.

The one area where School C was higher than School A was in perceived potential uses of the CMI: School C staff saw more total potential uses (11, vs. 8 for School A), as well as more per respondent (almost 3, vs. 2 at A). One explanation could be that since School A staff reported more

actual uses, potential uses by definition would be more limited than at other schools. Staff members at both Schools A and C saw considerable potential use of the CMI for parent conferences (43% and 50% respectively), while staff at the other schools did not give such a response. Other potential uses mentioned by several School C staff included testing or updating for the district (50%) and student diagnosis (38%). One School C teacher said that "the CMI might be useful for conferences with parents in providing specific information about student strengths and weaknesses." Another teacher thought that

> to have feedback . . . that . . . this school, this class . . . had problems with these particular types of concepts . . . I think that might be beneficial to the whole district.

Respondent attitudes related to CMI. School C also evidenced the second highest positive attitude toward the CMI (63%, vs. 86% for School A). School C had two staff members (25%) with a negative attitude, while School A had none. While one teacher said, "(I think) the CMI tests are good . . . (they) help to assess if a student really knows the material," another teacher who was initially positive toward the CMI had begun to have some negative feelings:

> When I was initially told about it, I thought . . . we're going to have these tests graded, and that's great, and have all this information back, and it's wonderful. I didn't realize that I would have to do so much.

The same teacher also said, "I would like to know more about . . . its capabilities . . . and I haven't had that question answered."

School C staff apparently felt less motivated overall than School A respondents to use the CMI (only 25% reported "mandated by district" and 25% "easier or faster to update" as incentives to use the CMI). These incentives were nearly identical to those for School D (the other middle school) staff.

Surprisingly, even though School C was generally second to School A in CMI use and in most areas related to attitude, its staff had the highest apparent resistance of the four schools to the CMI, as measured by our coding scheme. They indicated the most sources of resistance as well as the highest average number of sources per person. Strong sources of resistance were technical problems leading to frustration (88%), slow processing or reporting (75%), and inadequate training (50%), the highest or nearly the highest response percentages for any school in these categories. Examples of teachers' comments illustrating such sources of resistance are given in Appendix F.

Middle School School D

School D, the second middle school, was the remaining school among the pilot schools to exhibit implementation activity related to the CMI. The average number of different purposes per respondent (1.9) was second to

School A (2.6) but about the same as School D. Reported purposes of the CMI were diverse, with the predominant purpose being testing-related--testing and assessment of mastery (57%). One teacher said that the CMI "seems to be based on the CTBS test." Another described the CMI system as "the giving of tests and having them on the computer and having the computer grade them." Forty-three percent cited district standardization of mastery measurement as a purpose. One of these same teachers replied that the CMI tests tell "what the district expects." Staff was split between objectives and minimum proficiencies as the focus of their curriculum (43% each). One of the teachers said that "they (the district) have their objectives and (I) fall in line with their objectives," while another said, "We are supposed to be getting them to pass . . . proficiencies to graduate."

CMI procedures and personnel. From the beginning of School D's CMI implementation effort, a clerical aide was the key person in setting up the system and scanning tests. One of the three math teachers used the CMI tests extensively and did much of her own scanning. Two other math teachers used the CMI to a lesser extent, while a teacher near retirement used it very little. One teacher said, "I know that (the aide) uses it . . . most often, but who's actually responsible I don't know."

Key personnel. As stated, the clerical aide provided the technical support for CMI operations. Some of the teachers felt it was important having the aide as they were reluctant to scan tests themselves. For example, one stated:

> The one who does all the inputting and everything is (the aide). Now . . . at least one of (the teachers) inputs on and off too. I don't bother. I figure I'll probably mess the thing up.

The math RT had a positive attitude toward the CMI and reportedly was the coordinator, as the clerical aide's supervisor, but played a limited role. Thus, there was no instructional support to help teachers use CMI information. Teachers were on their own as far as using the CMI in their instruction was concerned. The principal's interest in and support of the CMI were low. His attitude toward it was not clearly either positive or negative.

Degree and focus of implementation--uses of the CMI. The overall degree of using the CMI was "some." School D staff reported fewer total different uses and number of uses per respondent than both School A and School C. The latter figure for School D was half that for School C, which in turn was half that for School A. Uses were somewhat scattered, with those most frequently mentioned being diagnosis, planning, and mastery assessment (43% for each). No other uses had more than one response. Reported potential uses were likewise lower in number than for Schools C and A, with the only two mentioned by three or more respondents being evaluation of staff and district testing/updating (43% each). See Appendix F for representative comments concerning teachers' uses of the CMI.

Respondent attitudes related to the CMI. The general attitude of School D staff toward the CMI (57% positive) was considerably below that of School A (86% positive), somewhat below that of School C (63% positive),

but considerably above School B (0% positive). One School D teacher said, "I like knowing what the district expects"; "I like the way it's set up . . . there were some negatives to start with but the way it's going is very good"; and "I like the consistency of it, the problems are consistent from test to test." Another teacher was negative:

> I was anxious to try it . . . My reaction was let's get this thing underway. Consequently I found every single bug that was in the program. My own proficiency tests are much more inclusive, . . . much more valid, are easier to administer, (and) much more economical to my time.

The total number of reported benefits, as well as the number per individual, also were third but close to the number reported at School C. Primary benefits indicated were "easier to test/update" (71%), instructional uses of diagnosis, planning, grouping, pacing (50%), and benefits for students (50%). Standardization of district measures of mastery was also mentioned as a benefit by some (43%). Incentives for using the CMI were the same as for School C: two responses (29%) each for "mandated by district" and "easier/faster to update." Sources of resistance to using CMI were about the same in total number as for School C, but somewhat lower (4.4 vs. 5.3) in sources coded per person (both of these figures were higher than for School A). The predominant sources included technical problems leading to frustration ("that's my main problem is the technical aspect of it"), problems with reports or data ("the matrix did not give the 8th graders credit for having passed the 6th grade test" and "the matrix did not agree at all with the printout"), too much class time involved ("there's an awful lot of work to be done in the classroom . . . for me to take time out of every day to shuffle these"), and lack of confidence in tests (see earlier quotes concerning one teacher's beliefs in the clear superiority of self-developed tests).

Elementary School B

Although named as a pilot school for 1984-85 implementation of the CMI, School B did not participate in the pilot effort. The school did have a half-time clerk in charge of the equipment and scanning, but the clerk reported scanning tests only a couple times for one or two teachers. We were able to interview only one teacher and a total of four staff at the school, including the clerk. Three of the four reported "monitoring student progress" as the purpose of CMI, while there were scattered other purposes suggested by single respondents.

CMI technical procedures and key personnel. As there was little or no use of the CMI, there is little information other than that the clerk was available to scan CMI tests if teachers would use them.

Degree and focus of implementation--uses of CMI. The principal did not encourage the use of the CMI. One teacher commented that CMI "was not a priority" of the school. The RT and the single teacher interviewed both reported morale problems at the school which required attention, leaving

little time for trying out the CMI system. In terms of potential uses of the CMI, few were mentioned (the least of all pilot schools) and no potential use was suggested by more than one person.

Respondent attitudes related to CMI. There was no respondent from School B with a clearly positive attitude. All four were coded as either uncertain or unknown. They did mention two benefits of the CMI: instructional uses of diagnosis, planning, grouping, or pacing and standardization of district measures (2 respondents for each), but the number of benefits given were much lower than for the other schools. The only incentive for using CMI that was mentioned was "mandated by district" (2 of the 4). The number of sources of resistance to the CMI was not far different from the other schools, but the types of resistance involved the lateness in the year (3 of 4), inadequate training (3 of 4), and too much or too rapid change (2 of 4), in addition to reported technical problems (2 of 4) which seemed a more predominant resistance at the other schools. School B staff, because of not using the CMI system, probably did not have an opportunity to encounter the technical problems themselves as was the case at the other schools.

Discussion

In examining our data related to the implementation of the CMI system at the four designated pilot schools, we found wide variation on all factors we studied, from reported purposes to instructional philosophy, actual and potential uses of the CMI, attitudes, sources of resistance, perceived benefits, and incentives to use the CMI. However, we found in general a consistent ordering of the four schools along all these dimensions. Such patterns can indicate relationships among the dimensions that in turn can suggest how schools might plan their CMI implementation efforts for greater effectiveness.

In degree of implementation and in the disposition of the staff to use the CMI, Elementary School A was clearly the most advanced and the most positive toward the CMI, followed in order by Middle Schools C and D, and then Elementary School B, which actually did not implement the CMI during the pilot period we studied.

We will organize our discussion of these implementation findings around several factors--technical procedures and personnel; focus on instructional uses; key instructional personnel; site climate and leadership; training; and attitudes and incentives--which appeared to be influential in the nature and degree of CMI implementation efforts at the individual school sites.

Technical Procedures and Personnel

Technical and time problems inhibited smooth operation of the CMI system in some schools. In one school to a greater extent (C) and one to a lesser degree (D), at least some teachers attempted to scan their own tests and typically found that it required a good deal of time and became frustrating. We found that the schools achieving the most complete

implementation in the pilot period had designated particular staff members, either an aide or clerk or a resource teacher, to operate the hardware and perform the various tasks associated with using the system (e.g., maintaining and distributing files of tests and answer sheets, collecting answer sheets and answer keys from teachers, scanning these into the computer system, and returning the test sheets or delivering the output reports to the teachers). One school (C), which began the pilot implementation with teachers performing their own scanning, later designated a staff member to assume responsibility for the scanning. Some teachers reported relief that they no longer had to deal with the system hardware. One teacher, for example, commented that much time was wasted by teachers before and after school dealing with technical problems with the scanner, which caused resentment among teachers.

As reported in a companion paper on barriers and facilitators to the CMI implementation (Terry, Crist-Whitzel, Edelstein, & Rowan, 1985; also see Crist-Whitzel, et al., 1985), lack of both time and access to hardware were generally problems for teachers in their efforts to implement CMI. When teachers were responsible for scanning their students' tests, they barely had enough time to deal with the hardware and its frustrations, let alone plan instruction based on the CMI information reports they received. Thus, lack of time also inhibited teachers attempts to use the system to enhance their teaching.

Focus on Instructional Uses

In three schools, teachers did use CMI results for instructional purposes. Where CMI implementation was the most advanced, there were more reported instructional applications of the information received on CMI reports. In the school with the most complete implementation, the resource teacher and all teachers reported using the CMI for grouping students and planning instruction; several teachers also reported using results for diagnosing learning needs and for pacing instruction. In addition to these instructional uses, School A teachers also reported testing and assessment uses as well. In the two middle schools (C and D), about half of the teachers reported uses for diagnosing and planning (School D) or for planning and grouping (School C). It seemed that when there were both (1) more reported instructional uses and (2) consistency of those uses across staff, as at School A, there also tended to be a greater degree of implementation of the CMI. In the schools where staff reported more instructional uses, they also generally perceived more potential uses of the system. The notable exception was School A; it seems likely that its staff members perceived a more limited array of potential uses because they reported a higher number of actual uses.

Key Instructional Personnel

We found that the two school sites with the most effective implementation of the CMI system, particularly as it related to instruction, had designated a resource teacher to have coordinating responsibilities for the CMI. In two schools (A and C), this person reviewed CMI reports with teachers and advised them about objectives and skills to focus on as well as possible instructional strategies. CMI uses

were greater in School A where a resource teacher performed this function from the beginning. In School C, a resource teacher began to take a more active role in encouraging instructional uses midway through their pilot implementation. In the school (D) where an instructional resource person did not perform such a function and teachers were left to their own initiative to use the information, we tended to see less instructional application of CMI information.

Site Climate and Leadership

We found that a key condition for a high degree of CMI implementation and its instructional applications seemed to be a supportive school "climate" with a strong supportive principal who valued the system and encouraged its implementation by teachers. In such a "supportive school climate," all or most of the staff share an instructional philosophy consistent with the purpose(s) of the CMI as well as an attitude fostering the exploration of new ideas aimed at improving teaching and learning.

For example, at the school with the highest degree of CMI implementation, our data showed that the principal, resource teacher, and nearly all teachers interviewed agreed that a primary purpose of the CMI was to focus on curriculum content and instructional objectives, and they stated that their curriculum was objective-based. A higher degree of CMI implementation thus seemed to be associated with multiple shared purposes of the system by all levels of the school staff and a shared staff focus on objective-driven instruction, a condition that seems consistent with the nature and purpose of the CMI and thus perhaps facilitates CMI use.

In the schools with the least evident degrees of CMI implementation, the staff cited diverse and individual purposes for the CMI, as well as fewer instructional purposes; the focus of their instruction and their overall attitudes toward the system also varied. These schools evidenced variable usage of the CMI testing system; no key instructional leader to guide teachers in curriculum development and instruction; no organizational groups to assist teachers with curriculum; more CMI problems cited; and more negative or uncertain attitudes about the system.

Where the principal and/or the resource teacher was fully supportive of the system and explicitly promoted its use by all teachers, there tended to be a greater degree of acceptance of the system, consensus of purpose, coordination of the use of the system by the resource teachers, and integration of the CMI into teachers' classroom management practices. In these schools, a key person coordinated instructional activities; more instructional uses and potential benefits of the CMI were reported; and fewer sources of resistance were mentioned.

Principals' support of the CMI varied. Where the teachers reported that they were not required to use the system by their principals, we found no usage of the system or less usage than in schools where key personnel were supportive of the system. Some principals didn't show much interest in the CMI and didn't feel its use was necessary. In these schools, use of the system was sporadic, or nonexistent.

Training

While the CMI technical training provided by the district was generally reported to be adequate and the technical support was considered to be a key factor in the ability of school personnel to deal with the hardware system, as noted elsewhere (Crist-Whitzel, et al., 1985; Terry, et al., 1985) quite a number of interviewees in the schools felt more training for instructional uses of the CMI was needed. We found that technical support personnel, when available at the pilot school sites, and resource teachers also played an important role in assisting teachers to use the system hardware, according to teachers we interviewed. However, CMI-related training focusing on instructional applications of the system was noticeably absent in these schools during the pilot phase. The only such instructionally oriented training in evidence was provided informally by individual resource teachers at some of the sites, apparently on their own initiative.

Attitudes and Incentives

In general, there appeared to be an absence of incentives or rewards for teachers in the pilot schools to implement the CMI system. On the contrary, many teachers seemed to feel that the CMI implementation represented a "mandate" from the district, imposed without any involvement on their part, findings consistent with those presented for all school personnel in the analysis of barriers and facilitators. In addition, CMI-related tasks brought added demands on teachers' time and thus sometimes detracted from their other instructional duties and activities. It is important to note that a majority of the teachers interviewed had generally positive attitudes toward the CMI and its potential uses; however, many of them mentioned negative features of the system. Typically, teachers did not perceive positive personal incentives beyond what some of them could envision on their own as having a positive impact on their testing needs and their teaching effectiveness. And, while many teachers could indicate at least some incentive to use the CMI, we found no mention of any evident rewards to teachers for exemplary use of the system.

There seemed to be a relationship among attitudes, perceived incentives and CMI benefits, and the degree of implementation (especially instructional uses) in the schools. In School A, the staff shared the most positive attitude toward the CMI of all the schools; they also saw the most benefits in the system and focused the most heavily as a staff on the instructional benefits; had the least amount of resistance toward the CMI. Although they, like the other schools' staff, reported the district mandate as an incentive to use the CMI, they were the only staff to be motivated as well to use the CMI for its positive potential or to support (please) the principal.

The Findings in Perspective

Consideration of some general principles regarding attempts at implementing innovations within organizations will help to place our findings in perspective by pointing out that OKESD is not unique in the problems or the outcomes of its implementation efforts, but in fact the

district operates like many other similar organizations introducing new programs.

A comparative example: implementation of an instructional information system in a school district. In a study of a somewhat similar innovation attempt, a school district evolved its innovative computerized instructional mangement system over a period of several years. It might be useful to point out some general comparisons of that district's successful implementation with the initial efforts of OKESD.

Williams and Bank (1984) studied "Baker" School District which implemented a program somewhat like the CMI system in OKESD. Baker, at the time of the study, had been involved in developing its CRT system over an eight-year period. The system was based on CRTs coordinated with the district curricular scope and sequence, similar to the CMI tests except that the CRTs were all teacher-developed. Its earlier years, like Oak Knoll's pilot phase we studied, included some resistance from teachers and administrators. However, after time the rate of adoption of the CRT system by teachers was very high.

Operationally, Baker schools showed some similarity to School A in Oak Knoll, the school with the highest degree of CMI implementation during our study. In Baker, there is a learning specialist in each school who provides CRT support for teachers similar to that of School A's resource teacher:

> the learning specialist . . . functions as a resource to teachers and makes it possible for them to act upon the diagnoses implied by their students' responses on CRT tests . . . brainstorms with the teachers about instructional alternatives. More importantly, he or she provides extra instructional time, on a pull-out basis, for children who need it. Learning specialists coordinate and facilitate the CRT testing, making sure that the teachers review and act upon them (Williams & Bank, 1984, p. 276).

In addition to these support functions, Baker's learning specialists also "provide in-service sessions about the functioning of the CRT system for new teachers, and they update experienced teachers about new policies" (p. 276). This function is consistent with the suggestion we make that resource teachers be utilized in CMI training. In Baker, the principals play a key instructional support role and are expected to spend considerable time in the classroom, as well as to review CRT results with teachers.

Reasons given by Williams and Bank (1984) for the success of the CRT system in Baker district included: (1) high levels of teacher participation (and their early involvement) in formulating the program and of familiarity with the system; (2) program workability, with a practical staff development program providing teachers with skills in acting on test results; (3) integration of all parts of the system, especially support from others in the school such as the learning and media specialists; (4) impact on planning which was both regular and collaborative, part of this

impact resulting from the fact that teachers were quite articulate about the positive uses of the CRTs. Other key elements of the CRT program were its provision of common goals and expectations; its encouragement of collegiality in the schools with a culture of cooperation and teamwork; and a sense of shared values and commitment to student achievement.

These characteristics of a successful district implementation of a system similar in many ways to the CMI amplify the model of School A in OKESD which showed the most successful CMI implementation.

A concluding practical perspective. It is important to point out that effecting an innovation takes considerable time. Our study encompassed only the first half-year's effort at a pilot implementation: its problems and successes need to be considered in that light. OKESD has had a start in its CMI implementation and, although its start was several months later than originally planned, such a late start is probably not unusual given the technical nature of the CMI hardware and software and the number of potential problems that could (and did) occur as a function of the complex technology. In another study of the implementation of computerized management systems in school districts, it was found that it took the districts five to eight years to evolve their programs to a relatively advanced state (Williams & Bank, 1984).

In view of the relatively short time span we studied, it is important to acknowledge the successes of the CMI pilot effort. First of all, it was intended to be a pilot "test": any pilot test is going to surface problems and "bugs". To the extent that the district "surfaced" all the technical "bugs" that it did and solved many of them (including many of those we have listed in our report), the pilot test can be considered a success, albeit perhaps a qualified one. The district learned a good deal about the technical nature of the system and about its use in selected schools: such knowledge will provide a great deal of information that can be used constructively in planning and coordinating any expansions of CMI implementation (such as its extension to reading and language) or in CMI implementation at new school sites. The district did have some examples of successful CMI implementation and use, particularly at School A, which can serve as models to other schools in the district as to how to go about implementing the CMI effectively.

Significance

As more districts incorporate technological innovations, focus on ensuring student mastery of basic skills, standardize their curricular objectives, and align their testing systems with their curriculum in efforts to reform their educational programs, there will be increasing interest in implementing computerized instructional management systems such as the one examined in this paper. Other districts can benefit from the experience of Oak Knoll. Particularly, patterns of successful implementation and use of such a system can provide guidance to other districts just planning or beginning implementation of their own computerized instructional management systems.

References

Block, J. H. (Ed.). Mastery Learning: Theory and practice. New York: Holt, Rinehart & Winston, 1971.

Bloom, B. S. Human characteristics and school learning. New York: McGraw Hill, 1976.

Brown, D. J. The change to administrative computing in schools. AEDS Journal, Fall 1984, 17-30.

Crist-Whitzel, J. L., Edelstein, R, & Terry, P. An interactive field study of a computerized instructional management system: Final Report. San Francisco: Far West Laboratory for Educational Research & Development, 1985.

Doyle, W., Crist-Whitzel, J., Donicht, T. L., Eixenberger, D. F., Everhart, R. B., McGeever, J. M., Pierce, D. R., & Toepper, R. M. The birth, nurturance and transformation of an educational reform. Tacoma, WA.: Northwest Regional Educational Laboratory (Experimental Schools Evaluation Project), 1976.

Filby, N. Technical proposal: Instructional Management Program. San Francisco: Far West Laboratory for Educational Research and Development, 1984.

Linn, R. L., Madaus, G. F., & Padulla, J. J. Minimum competency testing: The state of the art. American Journal of Education, 1982, 90, 1-34.

Milazzo, P., Buchanan, A., & Schutz, R. E. Methodology for analysis of IAI district level data bases. Los Alamitos, CA: SWRL Educational Research and Development, 1981.

Pincus, J. Incentives for innovation in the public schools. Review of Educational Research, 1974, 44, 113-144.

Roberts, J. M. E. Implementation of innovations in educational organization and instruction. New York: Research for Better Schools, Inc., 1978.

Rowan, B. Instructional management systems in school districts: Promises and pitfalls. San Francisco: Far West Laboratory for Educational Research and Development, 1984.

Rowan, B., Edelstein, R., & Leal, A. Pathways to excellence: What school districts are doing to improve instruction. San Francisco: Far West Laboratory for Educational Research and Development, 1985.

Spady, W. G. Outcome-based instructional management: A sociological perspective. The Australian Journal of Education, 1982, 26, 123-143.

Terry, P. D., Crist-Whitzel, J. L., Edelstein, R., & Rowan, B. Implementation of a computerized instructional management system: Barriers and facilitators. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, 1986.

Williams, R. C. & Bank, A. Assessing instructional information systems in two districts: The search for impact. Educational Evaluation and Policy Analysis, 1984, 6, 267-282.

APPENDIX

CODING MATRIX revised 6/12/85

Personal History

1 - 2 Personal identification number

10	George	00	Other
20	Hubbard		
30	Ocala		
40	Meyer		
50	Sheppard		
60	Shields		
70	Slonaker		
80	Pala		
90	District		

3 - 4 Position/Grade

		Highest Grade	
T	Teacher	0	Non-teacher
R	Resource Teacher	K - 8	
P	Principal	9	Unknown
A	Aide		
C	Clerical		
E	Comp Ed		
V	Evaluation		
U	Curriculum		

5 - 6 Years in district
99 Unknown

7 Pilot status of school in which employed
P Pilot
N Nonpilot

8 Level of school in which employed
E Elementary
M Middle

9 Card #1 or 2

10-11 Blank

Purpose/Communications (statement of purpose, use of system)

12 M Monitoring student progress - updating

13 C Curriculum - focus on content and instruction/objectives

14 T Testing - CTBS and assessment of mastery

15 E Evaluation of teachers, teacher performance

16 S Increase Test Scores

17 D Standardization of district measures of mastery

18-19 Blank

Curriculum/Content

20 Content Focus: Choose the one that applies.
- O On objectives (objective-driven instruction)
- T On text or other
- X Unknown, not mentioned
- M On minimum proficiencies

21 Change in textbook use
- Y Yes, there has been a change
- N No, there hasn't been a change
- X Not mentioned, unknown

22 Change in scope of curriculum
- M More extensive
- L Less breadth
- N No change
- U Coder uncertain, protocol unclear, respondent undecided
- X Not mentioned, unknown

23-25 Blank

Testing

26 Change in amount of testing with CMI/updating
- M More testing
- L Less testing
- N No change in amount of testing
- U Uncertain, unclear, undecided
- X Not mentioned, unknown

27 Difficulty of testing with CMI/updating
- M More difficult to test
- L Less difficult to test
- N No change in testing
- U Uncertain, unclear, undecided
- X Not mentioned, unknown
- C Conditional

28 Type of tests used
- C CMI
- U Unit tests from texts
- O Teacher's own tests
- X Unknown
- F Unit tests with teacher's own tests
- G CMI with unit tests
- H CMI with teacher's own tests
- J CMI with unit and own tests

29 Whether student performance on the CTBS objectives affects grading
- Y Yes
- N No
- X Unknown, uncertain, unclear

Instruction applications - test results and/or matrix: Non-CMI

30 - 37		How test information is used: code each of the following that apply; put in X when it doesn't.
30	G	Grouping/Placement
31	L	Planning
32	D	Diagnostics for individuals
33	P	Pacing
34	M	Mastery assessment
35	C	Minimum competency for promotion/graduation

Other applications of test results and/or matrix: Non-CMI

36	Z	Parent conferences
37	S	Student conferences
38	F	Family tutoring
39	E	Evaluation
40		Blank

Instruction

41 - 51		How CMI information is used: code each of the following that applies; put in X when it doesn't.
41	G	Grouping
42	L	Planning
43	D	Diagnostics for individuals
44	P	Pacing
45	M	Mastery assessment
46	C	Minimum proficiency/competency
47	Z	Parent conferences
48	S	Student conferences
49	F	Family tutoring
50	E	Evaluation
51 - 52		Blank

Updating

53 Updating other areas
- C CMI
- M Matrix
- N Nothing
- Z Subject area not applicable
- X Unknown

54 Present system used by person for updating math only
- C CMI
- M Matrix
- N Nothing
- Z Subject area not applicable
- X Unknown

55 - 56 Blank

Time Use

57 Time spent on CMI, updating, etc. (in hours per month: multiply daily by 20, weekly by 4)
- 1 0 - 5 hours/month
- 2 6 - 10
- 3 11 - 15
- 4 16+
- 9 Unknown

58 Change in time use
- M More
- L Less
- N No change
- U Uncertain (interviewee)
- X Unknown (to coder)
- C Conditional

59 - 64 Tasks

59 P Planning

60 S Scanning

61 R Recordkeeping and clerical

62 A Scoring

63 M Meetings

64 O Other

65 Blank

CODING MATRIX

Card 2

Potential Usage

12 - 24		Possible uses for the system: code each of the following that apply; put in X when it doesn't.
12	U	Updating/Placement
13	G	Grouping
14	L	Lesson Planning
15	D	Diagnostics for individuals
16	P	Pacing
17	M	Mastery Assessment
18	C	Minimum proficiency/competency
19	Z	Parent conferences
20	S	Student conferences
21	F	Family tutoring
22	E	Teacher evaluation
23	T	Testing
24	O	Other
25 - 26		Blank

Technical

27 Primary users of hardware

- T Teacher
- P Principal
- R Resource teachers
- C Clericals
- O Other
- A Aide
- X Unknown
- N Nonpilot

Technical (continued)

28 Location of equipment
- T Teacher workroom
- L Library
- O Office
- P Principal's office
- Z Other
- X Unknown
- N Nonpilot

29 - 34 Technical Problems: code each that applies; put X when it doesn't.

29 H Hardware

30 S Software

31 O Technical Output (e.g inaccuracies, missing info)

32 C System compatibility (incorporating other systems into CMI)

33 F Test format (including legibility)

34 Q Test quality (too hard, too easy, too short, proper alignment)

35 U Problems: Source unknown

36 - 37 Blank

Report Use: Is the output OK? Use the following codes:

38 - 41
- H Helpful
- S Satisfactory
- N Some problems
- M Many problems
- X Unknown, no comment

38 For teachers: format

39 For teachers: content - information

40 For parents

41 For students

42 - 43 Blank

CODING MATRIX

Training

44 Was training/inservice received?
- Y Yes
- N No
- X Unknown

45 Was the training effective?
- H Helpful
- S Satisfactory
- N Negative aspects
- X Unknown

46 Is there ongoing support?
- H Ongoing support: Helpful and of high quality
- S Ongoing support: Satisfactory
- N Not received or negative aspects
- X Unknown

47 - 48 Blank

Administrative Issues

49 Was respondent personally involved in the selection and development process of the CMI?
- Y Yes
- N No
- U Unknown, uncertain

50 What is respondent's attitude towards the CMI/updating system?
- P Positive
- N Negative
- U Uncertain, unclear, undecided
- X Not mentioned, unknown

51 - 52 Blank

Sources of Resistance

53 - 67 Put P as a personal concern of the respondent,
Y as a concern of others,
N in categories not reported.

53 Too much and/or too rapid change

54 Doubt about long term commitment to program

55 Too late in year for implementation

56 Technical problems leading to frustration/avoidance

Lack of support from:

57 respected teachers

58 teachers association

59 principal

60 district

61 Processing/reporting too slow

62 Problems with report or data (wrong names, misplaced info)

63 Fear of evaluation

64 Inadequate training

65 Too much paperwork

66 Too much class time

67 A lot/too much time

68 Coercion - mandated by district

69 Lack of confidence in tests

70 Teachers not asked for input

71 Coordination and supply of materials

72 Other

School Organization (Card 3) p.9

12 Collaboration with colleagues
- M More
- L Less
- N No Change
- U Uncertain
- X Unknown

13 - 21 For these numbers use the appropriate letter including:
- N No change
- X Unknown

Changes in meetings

13 A Yes, change in amount

14 T Yes, change in type

15 F Yes, change in frequency

Change in school structure

16 S New structure, e.g. lab

17 G Grade level collaboration

18 I Inter-grade level collaboration

19 D More departmentalization

20 C More self-contained classes

21 O Other

22 Class schedule changes within the school
- Y Yes, there have been changes
- N No, there haven't been any changes
- X Unknown

23 Staffing changes
- R Yes, changes in staffing responsibilities
- A Yes, adding staff
- D Yes, decreasing staff
- N No
- X Unknown

24 Changes in teacher relations with students
- A Yes, positive
- B Yes, negative
- N No change
- X Unknown

25 Changes in teacher relations with parents
- A Yes, positive
- B Yes, negative
- N No change
- X Unknown

26 - 27 Blank

Benefits

28 - 37 Possible benefits to using the system: code each of the following that apply; put in X when it doesn't.

28	T	Easier and/or faster to test
29	U	Easier to update
30	D	Standardization of district measures
31	A	Administrative needs
32	I	Instruction (planning, diagnostics, pacing, grouping)
33	S	Students
34	P	Parents
35	R	(makes teachers aware of) specific requirements and district expectations
36	Y	Accuracy of assessment/objectives measures
37	F	Improving instruction by focusing on objectives or proficiencies

38 - 39 Blank

Motivation/Incentives

40 - 44 Why do teachers use updating/CMI?

40	P	To please/appease the principal
41	M	Mandated
42	C	Curious/interested
43	B	Potential benefits
44	T	Easier and/or faster

45 - 46 Blank

Procedural Aspects

47 How much has the person used CMI?
- L A little
- S Some
- M A lot, much
- N Not at all
- X Unknown

48 How has the person used CMI?
- L Uses tests without scanning
- S Uses tests with someone else scanning
- M Uses test and scans himself
- N Not at all
- X Unknown

50 - 51 Blank

Recommendations for future use

52 C New, clearer test copies

53 K One key person responsible for scanning on site

54 T More technical training

55 I Training for instructional uses

56 A More administrative support in building and district

57 O Other